

Cardiovascular Disease The Federal Response

**Saralyn Mark, M.D.
Senior Medical Advisor
DHHS/OWH
&
NASA**

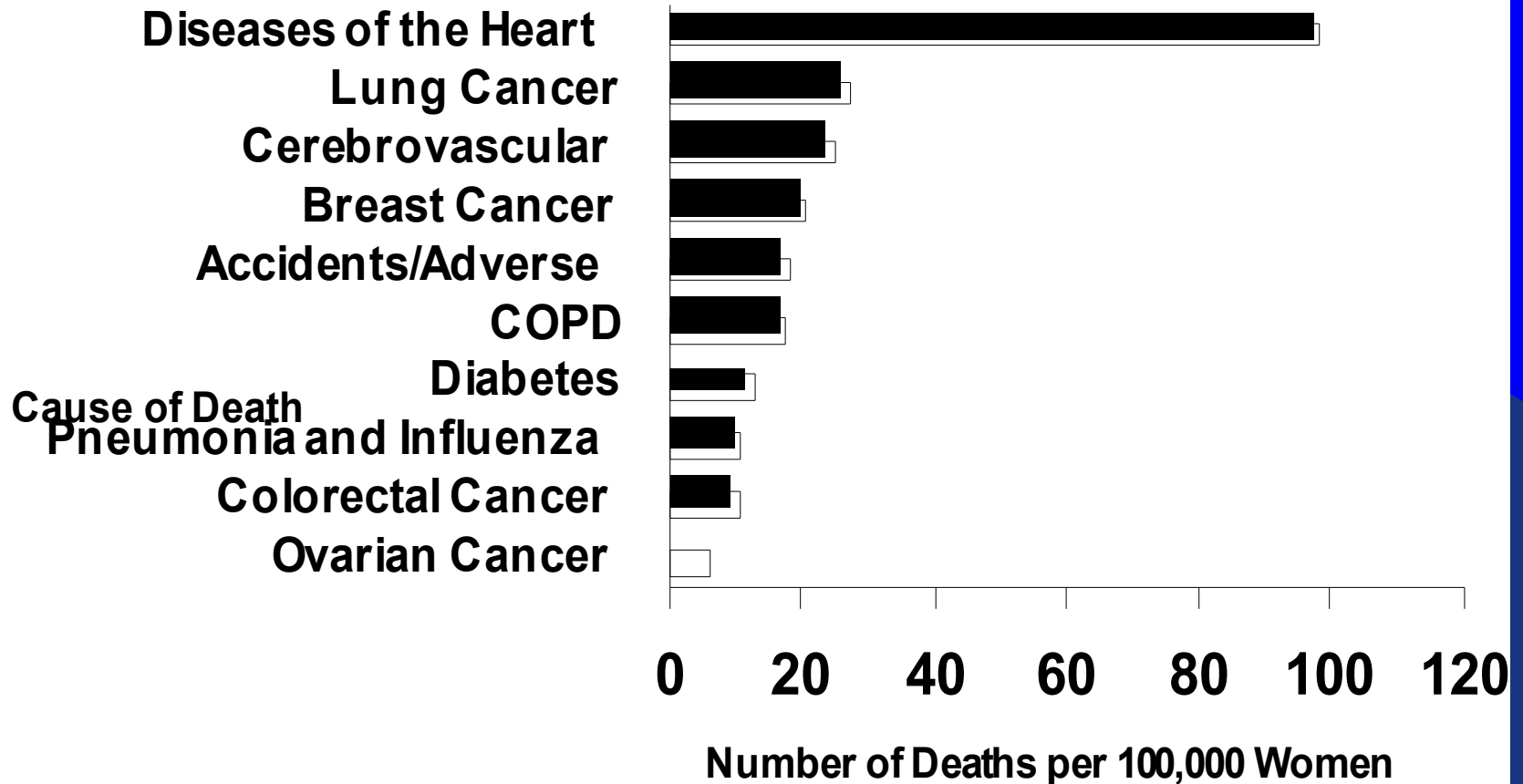


Cardiovascular Disease: Why Worry?

- ♥ **6% Women are concerned**
- ♥ **3% African American women are concerned**
- ♥ **60% Women are most concerned with cancer**

**SAWHR, 2002
n = 1019**

Leading Causes of Death for All Women



Cardiovascular Disease

Although deaths from cardiovascular disease have declined over the past 50 years, diseases of the heart remain the major cause of death for all females.

(*1972-1992: ↓ 51%)

Cardiovascular Disease

- ♥ **Leading cause of death for US women**
- ♥ **Kills approximately 503,000 women each year**
- ♥ **Responsible for 53% of all female deaths**
- ♥ **After menopause, a woman's chance of developing heart disease greatly increases**
- ♥ **1 in 3 US women over age 65 have some form of CVD**
- ♥ **Age and sex are significant predictors of death after heart attack**

Cardiovascular Disease and Sex

- ♥ **Symptoms are unique to women**
- ♥ **Women are more likely to have:**
 - Fatal cardiac events
 - Poorer prognosis after MI
 - More complications after coronary procedures
- ♥ **42 percent of women who have heart attacks die within 1 year, compared to 24 percent of men**

Cardiovascular Disease: Statistics

♥ **Among all ages, African American women are most likely to die from heart disease**

➤ **Mortality Rates:**

- **34 % higher for African American women than for Caucasian**
- **Declined more rapidly for Caucasian women than for African Americans**

Cardiovascular Disease: Disparities

A decorative graphic consisting of a blue arc that starts at the top left and curves towards the bottom right, ending in a blue wedge shape.

Cardiovascular Disease: Disparities

Cardiovascular Disease: Risk Factors

- ♥ **High cholesterol**
- ♥ **High blood pressure (50% C, 80% AA)***
- ♥ **Physical inactivity**
- ♥ **Smoking (22 million)**
- ♥ **Diabetes (15% C, 25% AA)***
- ♥ **Stress**
- ♥ **Obesity (48% C, 66% AA)***
- ♥ **Diet/poor nutrition**
- ♥ **Family history of heart disease**
- ♥ **Early menopause**
- ♥ **Estrogen therapy ?**

***Women of Color Health Data Book, 2001**

Research

- ♥ **HRT**
- ♥ **PEPI**
- ♥ **HERS**
- ♥ **ERA**
- ♥ **BRFSS**
- ♥ **SERM**
- ♥ **WHI**

HRT and CAD

- ♥ **30 observational studies suggest reduction**
- ♥ **Barrett-Connor (1998) meta-analysis found 35% ↓ in coronary risk in each user**
- ♥ **Observational studies and selection bias**
- ♥ **Need large prospective randomized trials**

PEPI Trial

Post Menopausal Estrogen Progestin Interventions Trial

- ♥ **Design:** A 3-year, multi-center, randomized double-blinded, placebo-controlled clinical trial
- ♥ **Subjects:** 875 women, aged 45-64
- ♥ **Intervention:** 1) Placebo; 2)CEE; 3)CEE+MPA (cyclic and continuous); 4)CEE +MP (cyclic)

The Writing Group for the PEPI Trial Effects of Estrogen Regimens on Heart Disease Risk Factors in Post Menopausal Women, JAMA, 1995.

PEPI Trial

Results:

Evaluated effects on lipids, fibrinogen, insulin, BP, endometrium, bone:

Lipids: a) Placebo ↓HDL (1.2 mg/dl) and ↑LDL (0.10mg/dl); CEE ↑HDL (5.6mg/dl) and ↓LDL (0.2mg/dl)

Fibrinogen: b) CEE ↓ (0.2g/l)

Glucose: c) ↓ fasting glucose

BP: d) Ø

Endometrium: e) CEE ↑ adenomatous and atypical hyperplasia (34%)

Bone: f) CEE + continuous MPA ↑BMD over all active treatments (5%)

HERS

- ♥ **Design:** Randomized, blinded, placebo-controlled secondary prevention trial
- ♥ **Subjects:** 2,763 women with CAD, <80 years old
- ♥ **Intervention:** 0.625 mg estrogen + 2.5 Provera® once-a-day or placebo x 4.1 years
- ♥ **Results:**
 - a. 172 in hormone group and 176 in placebo-MI or death
∴ ↑CHD events in year 1 vs. years 4 & 5.
 - b. ↑TEE, Gallbladder Dx by 2-3 fold

ERA

♥ **Methods:**

- Randomized, double-blind, placebo-controlled for secondary prevention
- 309 women angiographically verified CAD
- 0.625 mg ERT qD or 0.625 mg qD + 2.5mg MPA
- Duration: 3.2 +0.6 years
- Followed by angiograms

♥ **Results:**

- ↓ LDL(9.4%-16.5%)
- ↑HDL (18.8%-14.2%)
- Rates of clinical CV events similar among all RX Groups (not 1^o endpoint)

Neither RX Altered Progression of CAD

Diet and Lifestyle and CHD Incidence

♥ **Methods:**

- Prospective trial for primary prevention
- 85,941 women, ages 34-59
- 1980-1994 in Nurses Health Study (1976: 121,700 nurses)
- Diet and lifestyle factors (cig, HRT, body weight)

♥ **Results:**

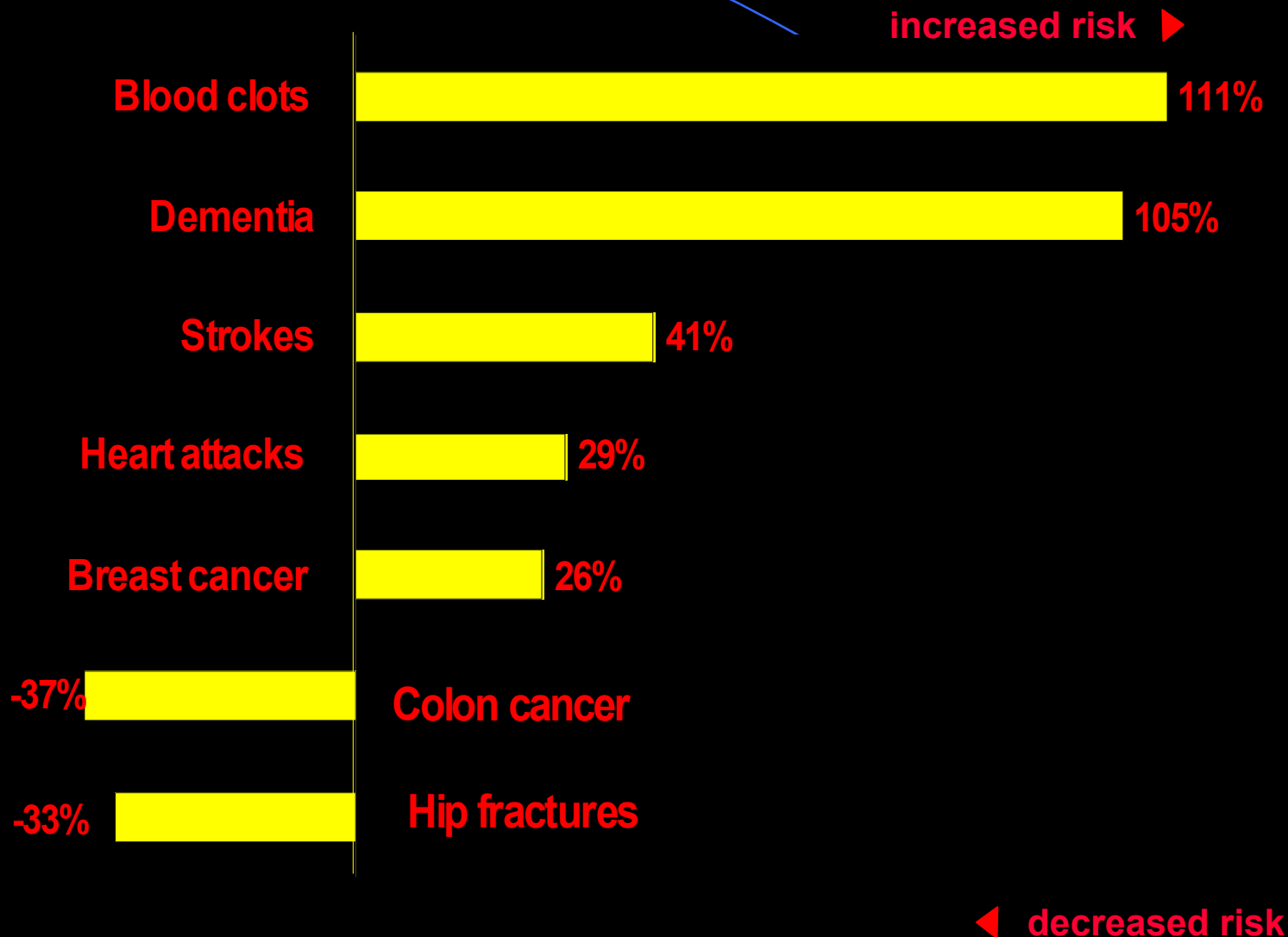
- Incidence of CAD ↓ 31%
- a. Smoking ↓ 41% (13% ↓ CAD)
- b. HRT use ↑ 175% (9% ↓ CAD)
- c. BMI (>25) ↑ 38% (8% ↑ CAD)
- d. Diet improved: trans fats ↓ 31%, cereal fiber ↑ 90%, folate ↑ 12%, meat consumption ↓, high fat dairy ↓, but glycemic load ↑ 22% (16% ↓ CAD)

Increasing Prevalence of Obesity Slowed Decline of CAD

SERM: Raloxifene and CAD

- ♥ **↓ LDL and Lp(a)**
 - Ø HDL, Tg
 - ↓ fibrinogen (greater ↓ than with E₂ with PEPI)
- ♥ **Bjarnason (1997): ↓ aortic accumulation of cholesterol in ovariectomized cholesterol fed rabbits**
 - ∴ Direct vascular effect?
- ♥ **RUTH: Raloxifene Use of the Heart**
 - 10,000 postmenopausal women in 26 countries
 - Criteria: CAD, PVD or ≥ 3 risk factors
 - 5-7 years

RISK FROM ESTROGEN/PROGESTIN THERAPY USE



Federal Response

- ♥ OWH
- ♥ ODPHP
- ♥ FDA
- ♥ CDC
- ♥ NIH
- ♥ NASA
- ♥ DOD

OWH

- ♥ **Interactive Cardio Health Self-Assessment Center for Women**
- ♥ **NWHIC: www.4woman.gov & 1-800-994-woman**
 - Publications: fact sheets, brochures, and reports
- ♥ **CoEs: 13**
- ♥ **CCoEs: 12**

ODPHP

Healthy People 2010: Objectives

- ♥ Reduce coronary heart disease deaths by 20%; **208 → 166***
- ♥ Increase proportion of adults 20 years and older who are aware of early warning signs and symptoms of heart attack;
- ♥ Reduce number of older adults with congestive heart failure as first diagnosis; ages 65-74 yrs: **13.2 → 6.5****
- ♥ Reduce stroke deaths; **60 → 48***
- ♥ Reduce proportion of adults with high blood pressure; **28% → 16%**
- ♥ Reduce mean total blood cholesterol levels among adults; **206 mg/dL → 199 mg/dL**
- ♥ Increase proportion of adults who have had their total blood cholesterol checked within the preceding 5 years; **67% → 80%**

*per 100,000 population

**per 1,000 population

FDA

- ♥ **Take Time to Care (↓ diabetic related complications)**
 - 500 local screenings
 - Free risk assessment and clinical testing
 - Diabetic management kit
- ♥ **Publications: fact sheets, brochures, and reports**

CDC

- ♥ **Cardiovascular Health Program (CVH)**
 - epidemiologic surveillance and research, intervention studies, and public health programs related to cardiovascular health
- ♥ **Funds 25 state-based cardiovascular health programs**
 - partnership development and coordination between government and non-governmental
 - development of effective strategies to reduce the burden of cardiovascular diseases and related risk factors
- ♥ **WISEWOMAN (Well Integrated Screening and Evaluation for Women Across the Nation)**
 - 2002: \$20 Million appropriation
 - Screening for heart disease and stroke risk factors
 - Dietary and physical activity counseling for women with abnormal screening results
 - Referrals and follow-up

NIH

- ♥ ***1991: Women's Health Initiative***
- ♥ ***National Heart, Lung, and Blood Institute***
 - **2002: \$1.65 Billion**
 - **SCCORS - Specialized Centers for Clinically Oriented Research**
- ♥ **RUTH Study (Raloxifene Use in the Heart):**
 - **Clinical research trial evaluating use of the osteoporosis drug raloxifene for prevention of coronary death and heart attack in postmenopausal women with coronary disease or at high risk for its occurrence.**
- ♥ **Other Studies**
 - **Nurses Study, Postmenopausal Estrogen/Progestosterone Intervention, NCCAM: Effect of High Dose Vitamin E on Carotid Atherosclerosis, Study of Women's Health Across the Nation: examining the behavioral factors and their relationships to cardiovascular health outcomes.**

NASA

♥ Spaced Based Technology

- **Excimer laser—removes atherosclerotic plaque**
- **Two-way communication—fine tunes pacemaker from outside of body**
- **High-precision measurement of carotid artery wall thickness**
- **In depth understanding of blood flow → design more efficient artificial heart valves and pumps**
- **Device to “rapidly” separate and analyze small volumes of blood**
- **Electrode technology (monitors heart rate) → exercise equipment which continually monitors user’s heart rate and sets the machine’s pace accordingly**

DOD

♥ **Physics Based Technology**

- **3-D Ultrasound—use of soundwaves; sophisticated computing techniques and advanced microelectronics to image action of internal body structure, e.g., beating heart**

Future Trends

♥ Telemedicine

- Reimbursement, licensing, and security

♥ CAM

- reimbursement
- safety and efficacy

♥ Genomics

- Discrimination: insurance/employment
- Genetic profiling
- Prevention and treatment

♥ Nanotechnology

- Prevention
- Nanomachines: e.g. cell herding, organs
- Immunotherapies: e.g. target antibodies

♥ Sex and Gender Based Medicine

- Prevention, diagnosis, and treatment
- NOT compete!

